

Abstract of the Disclosure

A prosthesis and a method of making a prosthesis having a needle containment and support structure that minimizes needle point plowing and/or needle scoring and inhibits delamination of the support structure during cannulization of the prosthesis. The prosthesis includes a first tube of expanded polytetrafluoroethylene (ePTFE), a polymer membrane, preferably ePTFE, positioned about the exterior surface of the first tube, and at least one support structure wound along a winding axis about the membrane to form axially spaced-apart ridges on the membrane. The support structure is a bead, filament, or similar structure that is wound about the exterior surface in a helical or spiral pattern to form the spaced apart-ridges. Alternatively, a plurality of spaced support rings can be employed to form the ridges. The ridges are preferably spaced apart a distance effective to direct a needle to a puncture site at an angle that inhibits needle plowing and hole enlarging, approximately less than 1.5 times the outer diameter of the needle. The polymer membrane has a microstructure selected to facilitate bonding of the support structure to the membrane and inhibit delamination of the support structure. In particular, substantially all the nodes forming the microstructure of the membrane are oriented at angle other 0° relative to the winding axis of the support structure. Preferably, substantially all the nodes forming the microstructure of the membrane are oriented in a direction substantially perpendicular to the winding axis of the support structure.